

CLAIMS

1. A method for compensating for critical dimension (CD) variations of pattern lines of a wafer, by the correcting the CD of the corresponding photomask, the photomask comprising a transparent substrate having two substantially opposite surfaces, a first back surface and a second front surface on which front surface an absorbing coating is provided, on which the pattern lines were formed by removing the coating at the pattern lines, the method comprising:
 - determining CD variations across regions of a wafer exposure field relating to the photomask; and
 - providing Shading Elements within the substrate of the photomask in regions which correlates to regions of the wafer exposure field where CD variations greater than a predetermined target value were determined,
 - whereby the shading elements attenuate light passing through the regions, so as to compensate for the CD variations.
2. The method of claim 1, wherein the providing of shading elements comprises employing pulsed laser.
- 20 3. The method of claim 2, wherein the pulsed laser comprises ultra-short femtosecond pulsed laser.
4. The method of claim 1, wherein the provision of shading elements is carried out by irradiating pulsed laser radiation through the back surface into the photomask and substantially opposite pattern lines.
5. The method of claim 1, wherein the at least some of the shading elements comprise Diffractive Optical elements.
- 30 6. The method of claim 1, wherein the shading elements are inscribed within the substrate by directing laser energy through the back surface.

7. The method of claim 1, wherein parameters for the shading elements is determined using a reference calibration list of parameters for shading elements and their relative attenuation power.

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8. The method of claim 1, wherein the shading elements are designed to cause attenuation of up to about 15%.

9. The method of claim 1, wherein the pulsed ultra-short femto-second laser is
10 operating at a fast repetition rate of more than one KHz, preferably at above 10 KHz.

10. The method of claim 1, further comprising using a computer program to calculate information on location, size and design parameters of the shading elements and use the information to operate a pulsed laser source to inscribe the shading elements within the photomask.

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11. The method of claim 10, wherein the computer program uses a reference calibration list to determine the parameters of the shading elements.

12. A method for compensating for critical dimension (CD) variations of pattern lines of a
20 photomask, substantially as described in the present specification, accompanying drawings and appending claims.